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Sanitation: A Call on Resources for Promoting Urban Child Health

Renu Khosla, Amit Bhanot and Karishma S.

Center for Urban and Regional Excellence, Director, Center for Urban and Regional Excellence, C-2, Green Park Extension, New Delhi 110016, India.

Correspondence to: Dr. Renu Khosla, Center for Urban and Regional Excellence, Director, Center for Urban and Regional Excellence, C-2, Green Park Extension, New Delhi 110016, India.

E-mail: brenukhosla@cureindia.org

Poor sanitation is known to increase the risk of morbidity and mortality from diarrhea among children. Several studies have found a high correlation between childhood morbidity and availability of sanitation services. It has been estimated that 1.7 million deaths each year, or 3.1% of all deaths are attributable to inadequate access to water, sanitation and hygiene. The urgency for sanitation in the urban environment stems from the fact that the urban poor live in crowded slums and informal settlements where sanitation facilities are particularly important for children's health and personal dignity. Demand for sanitation services has remained low, as livelihood priorities have been more pressing. There is a pressing need to get Governments and society to recognize the appalling toll created by poor sanitary conditions in urban poor settlements. Serious efforts should be made to develop local, national and international campaigns which promote convergence among programs aimed at urban health infrastructure, community development and education; motivate people to demand and maintain better sanitation; and place sanitation to the forefront of development and political dialogue.

Key words: Childhood mortality, Diarrhea, Sanitation, Urban poor.

ONE sixth of the world's population, approximately 1.1 billion people, does not have access to safe water and 2.4 billion people lack basic sanitation. Approximately, 62% of the deaths and 77% of the DALY's among children less than 5 years has been attributed to unsafe water, sanitation and hygiene(1). The developing world bears the burden of neglected sanitation services and among developing countries, the poor in cities, are the hardest hit. Rapid urban growth has placed increasing demand on infrastructure services. Resources needed to supply services are being stretched to their limit, resulting in sizeable under served populations and deteriorating quality or inadequacy of available infrastructure. Marketing sanitation is an uphill battle; marketing water supply

seems effortless in comparison. It seems unlikely however that human beings in general prefer to live in filth and disease ridden conditions as long as there is water(2). The Governments across the globe have understood the need for providing improved sanitation and have committed themselves at the "Millennium Declaration" to undertake measures to provide sanitation services particularly to the urban poor population [Millennium Development Goal-7; Target-11; Indicator-31](3).

Poor sanitation and hygiene: How it impacts child health

(a) *Degraded environments of low-income settlements add to child health burden.*

A follow up study of 212 preschool

children from low-income settlements of Mumbai noted a significant correlation between morbidity due to diarrhea, acute respiratory infections and fever; and household hygiene behavior, environmental sanitation and water availability(4). The population based case-control study in Porto Alegre and Pelotas in Brazil too found non-availability of piped water, absence of flush toilet, and residence in a poorly built house to be significantly associated with increased risk of childhood death from diarrhea(5). Children in homes without individual toilets in a study by NNMB in India showed significantly higher levels of malnutrition (*Table I*). Open defecation, un-disposed waste and lack of drainage in poor communities pose serious health threat to people particularly children, since pathogens contaminate drinking water

TABLE I—Malnutrition in Urban Slum Children Without Access to Sanitation

State	Weight for age < 2 SD in households	
	With toilets	Without toilets
AP	35.5	63.8
Bihar	37.0	75.8
Gujarat	42.0	55.5
Haryana	27.2	51.5
Karnataka	43.4	65.7
Kerala	23.5	40.0
MP	49.4	60.9
Maharashtra	47.0	63.1
Orissa	41.9	61.0
Punjab	39.8	58.0
Rajasthan	43.1	72.1
Tamil Nadu	35.7	44.2
UP	52.3	72.4
WB	35.9	67.6
Delhi	44.2	63.1

Source: National Family Health Survey (1992-1993), NNMB.

and multiply rapidly. Frequent episodes of illness have a serious impact on child's growth and future potential. In the Faeco-oral continuum of disease transmission, organisms can be transmitted through fluids, food, fingers, flies and fields(6). The most important intervention in preventing this transmission is sanitation. A review of more robust trials on hygiene interventions, such as safe disposal of children's stools, show that diarrhea morbidity can be reduced by 3%.

(b) Sanitation coverage: The very last priority after water supply

Huge advancements have been made in extending water coverage since 1980. Its health benefits have however, been offset by tardy progress in other areas, especially provision of sanitation facilities. Even as the country is progressing towards cent percent water outreach only half the population in cities is covered by sanitation services (*Table II*). The current low level of sanitation coverage (only 60% of the global population has access to any sort of improved sanitation) is partly explained by the low level of investment in sanitation compared with water supply(7).

Within a city, gap between rich and poor pertaining to access to basic services is huge, with sanitation facilities largely missing the poor (*Table III*). Benchmark Surveys, rapid appraisal and exploratory studies by National Institute of Urban Affairs (NIUA) note negligible sewerage coverage, severe drainage problem and poor solid waste collection in slums. Individual latrine availability in Delhi slums was dismal. Approximately 65% defecate in the open and only 8% use latrines (8-11). Similarly in a study of Indore slums, it was found that 40.5% go for open defecation(12).

Demand has remained low, as livelihood

TABLE II—Coverage under Sanitation and Water Supply in Urban Areas of India

Name of the survey (Year)	Sanitation	Water supply
National Sample Survey (1996)	50%	93%
National Family Health Survey (1999)	61%	94%
Joint Monitoring Program (1999)	49%	90%
Multiple Indicator Cluster Survey (2000)	76%	94%

priorities have been more pressing. In India while at the policy and national programming level, strategies for sanitation programming (such as Nirmal Bharat Abhiyan under Valmiki Ambedkar Malin Basti Awas Yojna, Ministry of Urban Development and Poverty Alleviation, Government of India, 2001) have

been well defined, but utilization remains behaviors can significantly reduce episodes of diarrhea. A recent literature review (Curtis and Cairncross 2002) has found that a single hygiene practice of washing one's hands with soap is alone able to reduce diarrhea incidence by over 40% and severe diarrheas (cholera, dysentery, and hospitalized diarrheas due to other causes) by over 50% (14). Six studies assessing hygiene interventions showed much higher reduction in diarrheal diseases between 32% and 43%. Median reduction of 22% in diarrheal disease due to better sanitation was noted in 21 of 30 studies. Improved sanitation practices had the greatest impact among non-breast fed infants (15).

Programming challenges in creating a city sanitation "Suraksha Chakra"

Healthy children must have healthy cities to grow in. Sanitation programs can wrap

TABLE III—Gaps in Access of Basic Services between Urban and Urban Poor

Data Source	NSS 38/44 Rounds 1993	NFHS 2 EHP 2002		NIUA studies				
		Urban		Urban				
		High	Low-income groups	Low-income groups				
Indicators/ State/ Cities	India Urban	Madhya Pradesh		Surat	Nagpur	Ludhiana	ECD studies, 1997	City
Drinking water	81.4							
Individual		84.0	56.1	42	45.84	64.43		5-75%
Community tap		11.8	24	36	54.16	17.32		
Toilet	63.9							
Private		97	13.3	45	59.53	92.78		0-50%
Community				35	17.97	3.14		
Open defecation	30.6	3.0	86.7	19	21.16	4.07		
Housing								
Pucca				8	22.17	62		25-100
Kutcha				32		7		8-25%

Source: Khosla R. Improving Health of Urban Poor Children: The Policy Framework EHP 2003.

in cities by creating a sanitation *suraksha chakra* (a Hindi phrase implying ‘circle of protection’). Several factors however prevent cities from making available services to urban poor settlements.

(a) *Illegitimacy of land tenure*

Lack of formalized land tenure while not a barrier to extension of networked infrastructure, creates doubt over service providers’ roles and responsibilities. While water supply is maintained on humanitarian grounds, local bodies see sanitation services that require creation of physical assets in communities, as extending legitimacy to illegal occupation of government lands.

(b) *Exclusion of poor in planning for service delivery*

Urban poor have little opportunity to participate in planning service delivery despite government’s urban poverty alleviation initiatives (Swarna Jayanthi Shahari Rozgar Yojana and its Community Development Societies). Authorities usually see community participation to be an endorsement of centrally approved decisions rather than a process by which needs of poor find reflection in city plans. Such lack of appreciation hinders stakeholder inclusion.

(c) *Insufficient experience with low cost technology options*

Best option for sanitation (underground sewerage systems with each household networked) is expensive requiring technical skills with recurrent operation and maintenance (O&M) costs. The alternate technology of pit latrines that are both healthy and low cost, is unexplored on a city scale.

(d) *Slow paced financial reforms: Willingness to charge versus confidence to pay*

Capital works require borrowing from

financial intermediaries, either government or private, and efficient accounting systems in municipalities for debt servicing. Raising municipal resources requires proactive measures like expanding tax base, seeking alternate revenue sources, improving collection systems, cost recovery, imposing user charges on the poor through community collection systems and transferring responsibility of contracting O&M services to communities. Presently, few municipalities are willing to charge, borrow from private intermediaries, or take vigorous measures to clean up their financial act.

(e) *Ineffective governance*

Lack of transparency, inefficient protocols, disjointed functioning of different departments, poor accounting procedures has meant poor governance of local institutions. Insular institutional arrangements have meant disconnected / uncoordinated endeavors and client dissatisfaction.

Institutional platforms and experiences

(a) Institutional arrangements for environmental infrastructure provision

(i) *National agencies:* Ministry of Urban Development; Ministry of Urban Employment and Poverty Alleviation; Ministry of Social Justice and Empowerment; Ministry of Health and Family Welfare; and Ministry of Human Resource Development.

(ii) *State agencies:* Directorates of Municipal Administration: With erosion of the municipal functional domain, State Water and Sewerage Boards had been created in some states to share responsibility for water supply, sewerage and drainage.

(iii) *Municipal agencies:* Urban Local Bodies

(ULBs) have an elected and an executive wing for decision-making and water and sanitation projects are implemented through the Public Health, Public Works and Revenue Department.

(iv) *Non-governmental organizations:* Of late, state /city governments are implementing sanitation projects in partnership with NGOs such as Sulabh International, SPARC, Safai Vidhyalaya, EXNORA, and Rajasthan Institute for Local Self Government. NGOs assist municipalities in developing need based project plans and evolving systems for community construction, maintenance and management of services through a process of community organization and capacity building(16).

(v) *Private sector:* Public private partnerships address sanitation needs in several cities for disposal of solid waste, maintenance of community latrines etc. Major role of the private sector has also been to provide resources for capital works. Lesotho's national sanitation program piloted in 1983 with private sector cooperation is now regarded as a model for integration of well-tested technologies, community involvement, and innovative organization and management styles. The high demand for well-maintained latrines is attributed to changes in people's sanitation behavior and increased ownership from inclusion(17).

(b) *Programs for environmental sanitation in urban slums*

Government programs focus on city sanitation include National Slum Development Program (NSDP); Nirmal Bharat Abhiyan under Valmiki Ambedkar Malin Baste Awaj Yojna (VAMBAY); Scheme for

Liberation of Scavengers; Low Cost Sanitation Scheme; and Draft National Slum Policy (DNSP)

(c) *Linking local government environmental hygiene action to community based*

Organizations of low income families: In Delhi, India, an NGO, Action for Securing Health for All (ASHA) has focused on improving health of poor people through community-based programs that address both poverty and environmental upgrading. ASHA facilitated formation of Mahila Mandals or community-based women's groups that met weekly to discuss community concerns. ASHA provided the interface with the formal system. Basti sevikas from the community were trained to provide basic health care treatment to neighborhood families. Efforts of all key actors including the Slum Wing led to reduced mortality rates and incidence of malnutrition among children(18).

Society for Promotion of Area Resource Centers (SPARC) in alliance with women's cooperative of pavement dwellers (Mahila Milan) and the National Slum Dwellers Federation (NSDF) has facilitated the process of construction of toilet blocks in two Indian cities, Mumbai and Pune. Communities managed the process of designing, contracting arrangements and construction of toilets and also formed maintenance committees. SPARC has demonstrated that sustainable poverty reduction is possible with community inclusion, community control over assets and better triangulation of community-government-donor agencies(19).

NIUA in partnership with USAID (United States Agency for International Development) and Cities Alliance in Ludhiana and with CARE India in Delhi has mobilized communities for slum upgrading and improved access to basic services.

Community's own action plans / efforts have unlocked municipal resources with systemic changes in city responses to service needs of the poor. Community based information systems (CBIS) using spatial analysis are being used by local bodies to improve coverage/ targeting

The way forward

Efforts to promote sanitation as a means of sustainable development received a huge boost in September 2002 as the World Summit on Sustainable Development (WSSD) concluded in Johannesburg(20). The need to come up with concrete plans of action to reduce by half the 2.4 billion people that do not have access to basic sanitation by the year 2015, was one of the priorities of WSSD.

The Tenth Five Year Plan of the Government of India also recognizes the need for aggressive efforts to improve urban sanitation, and has called for rejuvenating the implementation of various Government Programs(21).

(a) A partnership approach for urban sanitation systems.

Lessons from grass root efforts suggest that any long-term strategy for city sanitation must include: sense of ownership of the system that responds to felt needs (*i.e.*, a service that people want and are willing and able to pay for); participation of users/ agencies in capacity building of both (*i.e.*, for strengthening/development of institutions, efficient management, creation of enabling environments/supportive attitudes); and support services (*i.e.*, institutional reforms, policy frameworks and financial, technical, social and client services).It must be viewed as a process of community mobilization, demand generation, inclusive management, municipal reform, and creation of a favorable political

climate for community cost recovery through user charges.

(b) Options for addressing the strategic elements affecting the viability and sustainability of sanitation services in urban low income areas.

(i) Legal and regulatory framework: Improved Governance, in particular improved regulation and legislative frameworks have excellent track records as environmental health measures, but they must be properly implemented. Promote a regulatory framework that stimulates private-sector operators or public-private partnerships for services(22).

(ii) *Building political will:* Sanitation and hygiene improvement require political will and support. Seek and take opportunities to enlist leaders from all sectors/ levels of society to play an active part in promotional activity, and place sanitation to the forefront of development and political dialogue

(iii) *The social context:* Sanitation offers a particular challenge because people must be persuaded to install and use it. This requires market research, affordable designs, consumer choice and probably a partnership with private sector with more experience and capacity in this field. Other than social context, sanitation needs to be challenged at institutional, financial and environmental context.

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Key Messages

1. Rapid urban growth is placing increasing demand on infrastructure services resulting in sizeable under served populations and deteriorating quality or inadequacy of available infrastructure.
2. Well-planned water and sanitation interventions have been shown to be effective in bringing about 55% reductions in overall child mortality
3. Multi-stakeholder involvement and strengthening the institutional mechanisms responsible for providing sanitation is the key to providing improved sanitation in the country especially in the urban areas.

REFERENCES

1. Distribution of attributable mortality and DALYs by risk factor, age and sex, 2000. Available from, http://www.who.int/quantifying_ehimpacts/global/en/agesex.pdf. Accessed on 18th October 2005.
2. World Health Report: Reducing risks, Promoting Healthy Life. Geneva: World Health Organization; 2002.
3. Health in the millennium development goals: Goals targets and indicators related to health, available from <http://www.who.int/mdg/goals/en/>. Accessed on 18th October, 2005.
4. Udipi SA., Bhattacharjee LI, Parulkar R. Water availability, morbidity and nutritional status among socially disadvantaged preschool children in Bombay, India. *International Child Health Digest*, 1998; 9: 1.
5. Victoria CG, Smith PG, Vaughan JP, Nobre LC, Lombardi C, Teixeira AM, *et al.* Water supply, sanitation and housing in relation to the risk of infant mortality from diarrhoea. *Int J Epidemiol* 1988; 17: 651-654.
6. Wagner EG, Lanoix JN. *Excreta disposal for Rural Areas and Small Communities*, Geneva; WHO Monograph Series No. 39, WHO; 1958.
7. Global Water Supply and Sanitation Assessment 2000 Report, Available from http://www.who.int/docstore/water_sanitation_health/Globassessment/GlobalTOC.htm Accessed on 18th October, 2005.
8. National Institute of Urban Affairs. *Synthesis Report of Urban Basic Services Program*. Vol. 1, New Delhi: National Institute of Urban Affairs, 1997.
9. National Institute of Urban Affairs. *Early Childhood Care and Education in Urban Areas, City Studies*, New Delhi: National Institute of Urban Affairs; 1997.
10. National Institute of Urban Affairs, *Status of Urban Poor in Nagpur: A Benchmark Study*. New Delhi: National Institute of Urban Affairs; 2001.
11. National Institute of Urban Affairs, *Status of Urban Poor in Surat: A Benchmark Study*. New Delhi: National Institute of Urban Affairs; 2002.
12. Oxfam India Trust. *Poverty and Vulnerability in Indore slums*. New Delhi: Oxfam India Trust; 1999.
13. Traore E, Cousens S, Curtis V, Mertens T, Tall F, Traore A. Child defecation behavior, stool disposal practices, and childhood diarrhea in Burkina Faso: Results from a case-control study. *J Epidemiol Community Health*, 1994; 48: 270-275.
14. Curtis V, Cairncross S. Effect of washing hands with soap on diarrhea risk: A systematic review. *Lancet Infect Dis* 2003; 3 : 275-281.
15. Favin M, Yacoob M, Bendahmane D. *Behavior First: A Minimum Package of Environmental Health Behaviors to Improve Child Health*, Applied Study No. 10, Arlington VA:

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- Environment Health Project; 1999.
16. IRC International Water and Sanitation Centre. Operation and Maintenance of Sanitation Systems in Urban Low-Income Areas in India and Thailand. Report on a joint research programme, 1989-1993. Delft, The Netherlands : IRC International Water and Sanitation Centre, 1997.
 17. Blackett IC. Low-cost Urban Sanitation in Lesotho, Washington DC: UNDP -World Bank Water and Sanitation Program; 1994.
 18. Mehta P. Action for Securing Health for All. New York: Mega-Cities Project and New Delhi: National Institute for Urban Affairs; 1994.
 19. Patel S, Mitlin D. The work of SPARC, the National Slum Dwellers Federation and Mahila Milan. Working Paper No. 5. on Poverty Reduction in Urban Areas London : International Institute for Environment and Development; 2001.
 20. Report of the World Summit on Sustainable Development-Johannesburg, South Africa 26 August- 4 September. Available from <http://daccessdds.un.org/doc/UNDOC/GEN/N02/636/93/PDF/N0263693.pdf>. Accessed on 18th October, 2005.
 21. Civic Amenities in Urban Areas. Chapter 6.2, Tenth five Year Plan (2002-2007), Planning Commission, Government of India. Available from http://planningcommission.nic.in/plans/planrel/fiveyr/10th/volume2/v2_ch6_2.pdf Accessed on 18th October, 2005.
 22. Wegelin-Schuringa M. Strategic elements in water supply and sanitation services in urban low-income areas. WATER front, 2000; 14: 3-6.
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